that the features of Strandberg are applied to a surface as tiles, as recited in the claims. Nowhere in Strandberg is there application of an image feature to a surface.

Claim 1 has been amended to recite tile data structures representing plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other. Amended claim 1 clarifies that the recited image texture for tiled texture mapping corresponds to multiple instances of an image feature that are rendered simultaneously. As described in the application, "texture mapping often entails applying an array of many copies of the texture tile to the image geometry (i.e., tiling) to cover it with the image or surface texture." (Application page 1, lines 19-21.)

Applicants submit that the claimed tile data structures are distinct from the cited Strandberg patent, which describes multiple distinct orientations of an image character. Strandberg is directed to rendering image characters, and only one orientation of each character component is rendered at a time. Strandberg provides to teaching or suggestion of image textures for tiled texture mapping. Moreover, Strandberg provides no teaching or suggestion of image texture views that are rendered simultaneously on a display screen immediately adjacent each other. Instead, Strandberg is directed to rendering only one of a variety of character orientations at a time. Applicants request, therefore, that the rejection of claim 1 be withdrawn.

Claims 2-15 depend from claim 1. Applicants submit that claims 2-15 are allowable for the reasons set forth above with reference to claim 1. In addition, applicants submit that the dependent claims are also allowable for the following reasons.

With regard to claim 2, the Examiner states that the method of oblique-parallel projection is one of the well-known methods of perspective viewing. Applicants acknowledge that oblique-parallel projection is known in the art. Applicants submit, however, that there is no teaching or suggestion of

applying such a projection to image textures for tiled texture mapping, as recited in the claim.

With regard to claim 3 and its dependent claims 4-8, the Examiner states that Strandberg shows that "plural respective views correspond to a range of user viewing angles and each tile data structure corresponds to a segment in the range of user viewing angles ("If the movement revolution is determined to 240 positions per revolution and axis (=1.5 degrees) ", column 11, line 51-52)."

Amended claim 3 recites plural respective views corresponding to a range of user viewing angles that are rendered simultaneously on the display screen. Applicants submit that the angular ranges cited by the Examiner correspond to character image orientations in terms of "space angles" (i.e., the angular orientation of a character feature in space), rather than a "range of user viewing angles" as recited in the claim. Nothing in the passage cited by the Examiner refers to rendering features simultaneously at multiple user viewing angles, as recited in claim 3. Applicants request that this rejection be withdrawn because it is not supported by a teaching or suggestion of the features recited in the claim.

In further regard to claim 5, the Examiner states that:

> "As for the viewing angles are with respect to a predetermined reference and the segments closest to the predetermined reference are smaller that the segments farthest from the predetermined reference orientation, it would have been obvious to have closer interval at near range to have a smoother transition."

Applicants note that the passages cited by the Examiner in reference to claims 3 and 4 relate to character image orientations. The Examiner cites no teaching or suggestion that relates to user viewing angles or a predetermined reference relating to the user viewing angles. From the Examiner's statement that "it would have been obvious to have closer interval at near range to have a smoother transition," applicants are unable to discern what predetermined reference the "near range" refers to in the context of the arbitrary character image orientations of Strandberg. Applicants request that this rejection be withdrawn because it is not supported by a teaching or suggestion of the features recited in the claim.

With regard to claims 9-12, the Examiner states that the views of Strandberg "are stored two dimensional (see Figure 2). One dimension is realized by holding either one of the dimensions constant." Applicants submit that the "views" referenced by the Examiner are actually "space angles" according to Strandberg. There is no teaching or suggestion in Strandberg of user viewing angles varying over one- or two-dimensional angular ranges. Nothing in the passage cited by the Examiner refers to user viewing angles. Strandberg refers to viewing angles only in connection with Fig. 3, which shows different expressions at only one viewing angle. Hence, Strandberg explicitly distinguishes viewing angles from space angles, thereby eliminating any support for the Examiner's interpretation that a space angle is the same as a viewing angle. Applicants request that this rejection be withdrawn because it is not supported by a teaching or suggestion of the features recited in the claim.

Claim 13 has been amended to refer to image texture surfaces, rather than faces, to clarify the distinction between the texture map tiles of the present invention and the character faces of Strandberg.

With regard to claim 16, the Examiner states that Strandberg discloses each of the features recited in the claim. Amended claim 16 recites:

> identifying plural adjacent regions of the image surface to which regions the texture map is to be applied;
>
> determining a user viewing angle for each of the plural regions;
>
> correlating each viewing angle with a texture map tile corresponding to the viewing angle; and
>
> rendering the texture map tiles simultaneously at the adjacent regions on the computer display screen to form the texture map on the image surface.

Amended claim 16 clarifies that the recited image texture for tiled texture mapping corresponds to multiple instances of an image feature that are rendered simultaneously. As described in the application, "texture mapping often entails applying an array of many copies of the texture tile to the image geometry (i.e., tiling) to cover it with the image or surface texture." (Application page 1, lines 19-21.)

Applicants submit that the claimed texture map tiles are distinct from the multiple singular distinct orientations of an image character described in the Strandberg patent. Strandberg is directed to rendering image characters. Strandberg provides no teaching or suggestion of image textures for tiled texture mapping. Moreover, Strandberg provides no teaching or suggestion of rendering the texture map tiles simultaneously at the adjacent regions on the computer display screen to form the texture map on the image surface. Instead, Strandberg is directed to rendering only one of a variety of character views at a time.

Strandberg does not mention determination of plural user viewing angles. Instead, the angular ranges in Strandberg cited by the Examiner correspond to character image orientations in terms of "space angles" (i.e., the angular orientation of a character feature in space). The only reference to a viewing angle in Strandberg is that Fig. 3 shows character facial expressions at only one viewing angle. Hence, Strandberg explicitly distinguishes user viewing angles from space angles, thereby eliminating any support for the Examiner's interpretation that a space angle is the same as a viewing angle.

A character would be rendered by the Strandberg system regardless or independently of the user viewing angle. In contrast, the claimed method can provide an accurate three-dimensional representation of multiple texture map tiles by determining a user viewing angle for each of plural regions. As an illustration, there is no indication in Strandberg that a changed viewing angle would have any effect on a rendered character. In contrast, a changed user viewing angle would change how each texture map tile would be rendered by the claimed invention. Accordingly, applicants request that the rejection of claim 16 be withdrawn.

Claims 17-26 depend from claim 16. Applicants submit that claims 17-26 are allowable for the reasons set forth above with reference to claim 16. In addition, applicants submit that the dependent claims are also allowable for the following reasons.

With regard to claims 17 and 18, the Examiner states that Strandberg "discloses the texture map tile corresponding to the viewing angle is one of plural predetermined texture map tiles stored in a computer memory ("information relating to other body segments, such as upper arm, lower arm, hands, etc., is stored", column 8, line 31-33 where the body parts are considered tiles)." Applicants respond as follows.

Claims 17 and 18 have been amended to be consistent with amended claim 16. As stated above in reference to claim 16, applicants submit that Strandberg is directed to character image generation of discrete characters and provides no teaching relating to texture map tiles or to simultaneous viewing angles for each of multiple regions. The Examiner states that "the stored torso images are considered tiles." The Examiner is allowed to interpret claim language as broadly as is reasonable. Applicants submit, however, that the Examiner's interpretation is improperly broad and unsupported by the art. There is no teaching or suggestion that the features of Strandberg are applied to a surface as tiles, as recited in the claims. Nowhere in Strandberg is there application of an image feature to a surface. Applicants request, therefore, that the rejections of claims 17 and 18 be withdrawn.

With regard to claim 19-23, the Examiner states that "the viewing angle are two dimensional (as shown in Figure 2). One dimension is realized by holding either one of the two dimension constant." Applicants respond as follows.

Claims 19, 21, and 23 have been amended to be consistent with the reference to rendering at plural regions simultaneously, as recited in claim 16. Applicants submit that the "views" referenced by the Examiner in regard to claims 19-23 are actually "space angles" (i.e., the angular orientation of a character feature in space). There is no teaching or suggestion in Strandberg of user viewing angles varying over one- or two-dimensional angular ranges. Nothing in the passage cited by the Examiner refers to user viewing angles. Strandberg refers to viewing angles only in connection with Fig. 3, which shows different

expressions at only one viewing angle. Hence, Strandberg explicitly distinguishes viewing angles from space angles, thereby eliminating any support for the Examiner's interpretation that a space angle is the same as a viewing angle. Applicants request that this rejection be withdrawn because it is not supported by a teaching or suggestion of the features recited in the claim.

With regard to claim 24, the Examiner states that "the oblique parallel projection is one of the well known methods of perspective viewing. Applicants acknowledge that oblique-parallel projection is known in the art. Applicants submit, however, that there is no teaching or suggestion of applying such a projection to image textures for tiled texture mapping, as recited in the claim. Applicants request, therefore, that this rejection be withdrawn.

Independent claims 27 and 34 have been amended to recite subject matter analogous to claims 1 and 16. In addition, dependent claims 35-39 have been amended for consistency with their base claims. Applicants submit that claims 27-39 are patentably distinct for the reasons set forth above in reference to claims 1-26. Applicants request, therefore, that the rejections of claims 1-13, 15-24, 26-31 and 33-39 be withdrawn.

Claims 14, 25 and 32 are rejected under 35 U.S.C. 103(a) for obviousness over Strandberg as applied to claims 1, 16 and 27, and further in view of Cosatto et al. (5,995,119). The Examiner states that "Strandberg does not explicitly disclose using morphing technique to generate respective view, however, this is known in the art as taught by Cosatto et al." Applicants respond as follows.

Applicants acknowledge that morphing is known in the art. However, Strandberg and Cosatto et al. are both directed to generating animated characters. Neither Strandberg nor Cosatto et al. teaches or suggests application of morphing to image textures for tiled texture mapping, as recited in the claims. Applicants submit, therefore, that the rejections are improper for failing to show each feature recited in the claims. Applicants request, therefore, that the rejections of claims 14, 25, and 32 be withdrawn.

Added claims 40-42 are identical to original claims 16, 27, and 34. With regard to claims 40-42, applicants traverse the rejections of original claims 16, 27, and 34 for the following reasons.

With regard to claim 40 (original claim 16), the Examiner that Strandberg discloses the claim features as follows:

> identifying a region of the image surface to which region the texture map is to be applied ("the drawings of the desired figure are scanned in as key drawings ", column 11, line 66-67);
>
> determining a viewing angle for the region (this step is inherent since the image data stored are related to space angle);
>
> correlating the viewing angle with a texture map tile corresponding to the viewing angle ("to match the movement data of the actor with the movement data of the stored figure", column 12, line 13-14); and
>
> rendering the texture map tile at the region on the computer display screen (Figure 1; 8).

As noted by the Examiner, Strandberg is directed to rendering image characters. Strandberg provides no teaching or suggestion of mapping tiled textures to an image surface or even rendering character features onto a "surface." Applicants submit that the rejection is improper for failing to show in the cited reference every feature recited in the claim.

The Examiner states that "the stored torso images are considered tiles." The Examiner is allowed to interpret claim language as broadly as is reasonable. Applicants submit, however, that the Examiner's interpretation is improperly broad and unsupported by the art. There is no teaching or suggestion that the features of Strandberg are applied to a surface as tiles, as recited in the claims. Rather than citing tiles applied to a surface, the Examiner cites the matching of movement data to the movement of a stored actor. Nowhere in the cited matching of movement data is there a reference to a viewing angle. Nowhere is there application of an image feature to a surface. Accordingly, applicants submit that the rejection of claim 16 (claim 40) is improper and request that claim 40 be allowed.

With regard to claim 41 (original claim 27), the Examiner that Strandberg discloses the claim features as follows:

> determining plural selected viewing angles for viewing the image texture (Figure 1; M1, M2, M3);
>
> correlating each selected viewing angle to a predetermined range of viewing angles that includes the selected viewing angle ("to match the movement data of the actor with the movement data of the stored figure", column 12, line 13-14); and
>
> forming for each of the selected viewing angles a data structure that includes a projection of the image texture relative to the selected viewing angles ("The thus obtained image parts in a selected sequence and then presents the assemblage on one or more display units, such as a monitor 8, or on a projection area of a film", column 10, line 38-41).

The "angles" M1, M2, M3 cited by the Examiner are measuring points for a DATASUIT worn by an actor. Strandberg provides no teaching or suggestion of determining plural selected viewing angles for viewing an image texture. Strandberg does not even mention image textures. Strandberg is directed to rendering image characters in relation to "space angles" (i.e., the angular orientation of a character feature in space). Strandberg does not even mention determination of plural viewing angles. The only reference to a viewing angle in Strandberg is that Fig. 3 shows character facial expressions at only one viewing angle. Hence, Strandberg explicitly distinguishes viewing angles from space angles, thereby eliminating any support for the Examiner's interpretation that a space angle is the same as a viewing angle. Accordingly, applicants submit that the rejection of claim 27 (claim 41) is improper and request that claim 41 be allowed.

Applicants submit that claim 42 (original claim 34) is allowable for the reasons set forth above in reference to claims 40 and 41.

With further regard to claims 40-21, Strandberg does not mention determination of plural user viewing angles. Instead, the angular ranges in Strandberg cited by the Examiner correspond to character image orientations in terms of "space angles" (i.e., the angular orientation of a character feature in space). The only reference to a viewing angle in Strandberg is that Fig. 3 shows character facial expressions at only one viewing angle. Hence, Strandberg

explicitly distinguishes user viewing angles from space angles, thereby eliminating any support for the Examiner's interpretation that a space angle is the same as a viewing angle.

A character would be rendered by the Strandberg system regardless or independently of the user viewing angle. In contrast, the claimed method can provide an accurate three-dimensional representation of multiple texture map tiles by determining a user viewing angle for each of plural regions. As an illustration, there is no indication in Strandberg that a changed viewing angle would have any effect on a rendered character. In contrast, a changed user viewing angle would change how each texture map tile would be rendered by the claimed invention. Accordingly, applicants request that claims 40-42 be allowed.

Applicants believe the application is in condition for allowance and respectfully request the same.

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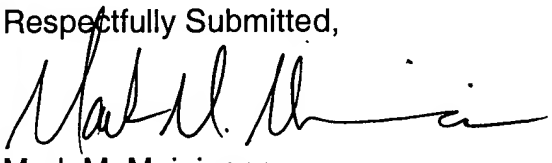
Respectfully Submitted,



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Attachment
Claims 1-42
Application Number: 09/195,728

1. (Amended) A computer-readable medium having stored thereon a tile data structure for a tile representing an image texture for tiled texture mapping, comprising:

plural tile data structures representing plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other.

2. The medium of claim 1 in which the plural respective views of the image texture are based upon oblique-parallel projections of the image texture.

3. (Amended) The medium of claim 1 in which the plural respective views correspond to a range of user viewing angles that are rendered simultaneously on the display screen, [and] each tile data structure [corresponds] corresponding to a segment in the range of user viewing angles.

4. The medium of claim 3 in which the segments in the range of user viewing angles are not equal.

5. The medium of claim 4 in which viewing angles are with respect to a predetermined reference and the segments closest to the predetermined reference are smaller that the segments farthest from the predetermined reference orientation.

6. The medium of claim 3 in which the segments in the range of user viewing angles are equal.

7. The medium of claim 3 in which the range of viewing angles extends over viewing angles of positive and negative magnitudes relative to a viewpoint position.

8. The medium of claim 7 in which the segments of viewing angles of positive magnitudes to which tile data structures correspond are matched one-to-

one with the segments of viewing angles of negative magnitudes to which tile data structures correspond.

9. The medium of claim 1 in which the plural respective views are within only one angular dimension.

10. The medium of claim 9 in which the one angular dimension is a horizontal angular dimension corresponding to angles within a horizontal imaging plane.

11. The medium of claim 1 in which the plural respective views are within only two angular dimensions.

12. The medium of claim 11 in which the two angular dimensions are a horizontal angular dimension corresponding to angles within a horizontal imaging plane and a vertical angular dimension corresponding to angles within a vertical imaging plane.

13. (Amended) The medium of claim 1 in which the image texture includes an outer [face] surface and the outer [face] surface is of the same dimensions in each of the plural respective views of the image texture.

14. The medium of claim 1 in which the plural respective views of the image texture are based upon morphings of the image texture.

15. The medium of claim 1 in which the plural respective views of the image texture are based upon manually formed renderings of the image texture.

16. (Amended) A computer method of applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:

identifying [a region] plural adjacent regions of the image surface to which [region] regions the texture map is to be applied;

determining a user viewing angle for [the region] each of the plural regions;

correlating [the] each viewing angle with a texture map tile corresponding to the viewing angle; and

rendering the texture map [tile] tiles simultaneously at the [region] adjacent regions on the computer display screen to form the texture map on the image surface.

17. (Amended) The computer method of claim 16 in which the texture map tile corresponding to the viewing angle for each region is one of plural predetermined texture map tiles stored in a computer memory.

18. (Amended) The computer method of claim 16 in which the texture map tile corresponding to the viewing angle for each region is calculated based upon the determining of the viewing angle.

19. (Amended) The computer method of claim 16 in which determining a viewing angle for [the] each region includes determining only one viewing angle for the region corresponding to angles within only one imaging plane.

20. The computer method of claim 19 in which the one viewing angle is a horizontal viewing angle corresponding to an angle within only a horizontal imaging plane.

21. (Amended) The computer method of claim 16 in which determining a viewing angle for [the] each region includes determining two viewing angles corresponding to angles within two transverse imaging planes.

22. The computer method of claim 21 in which the two viewing angles are a horizontal viewing angle and a vertical viewing angle corresponding to angle within horizontal and vertical imaging planes, respectively.

23. (Amended) The computer method of claim 16 in which determining a viewing angle for [the] each region includes determining only one viewing angle for the region corresponding to angles within only one imaging plane.

24. The computer method of claim 16 in which the texture map tile corresponding to the viewing angle is of a predetermined tile structure and includes an oblique parallel projection the predetermined tile structure.

25. The computer method of claim 16 in which the texture map tile corresponding to the viewing angle is of a predetermined tile structure and includes a morphing of the predetermined tile structure.

26. The computer method of claim 16 in which in which the texture map tile corresponding to the viewing angle is of a predetermined tile structure and includes a manually formed renderings of the predetermined tile structure.

27. (Amended) A method of generating a tile data structure in a computer readable medium representing an image texture for a tiled texture mapping, comprising:

determining plural selected viewing angles for viewing simultaneously plural adjacent tiles of the image texture;

correlating each of the plural selected viewing [angle] angles to a predetermined range of viewing angles that includes the selected viewing angle, immediately successive predetermined viewing angle ranges being correlated to adjacent tiles of the image texture; and

forming for each of the selected viewing angles a data structure that includes [a projection] plural projections of the image texture relative to the selected viewing angles of plural adjacent tiles to be viewed simultaneously.

28. The method of claim 27 in which the image texture includes a front surface with predetermined dimensions and the projections of the image texture relative to the selected viewing angles maintains the predetermined dimensions of the front surface of the image texture.

29. The method of claim 27 in which the projections of the image texture relative to the selected viewing angles are oblique parallel projections.

30. The method of claim 27 in which the plural selected viewing angles are within only one angular dimension.

31. The method of claim 27 in which the plural selected viewing angles are within only two angular dimensions.

32. The medium of claim 27 in which the plural respective views of the image texture are based upon morphings of the image texture.

33. The medium of claim 27 in which the plural respective views of the image texture are based upon manually formed renderings of the image texture.

34. (Amended) In a computer readable medium, computer software instructions for applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:

software instructions for identifying [a region] plural adjacent regions of the image surface to which [region] regions the texture map is to be applied;

software instructions for determining a viewing angle for [the region] each of the plural regions;

software instructions for correlating [the] each viewing angle with a texture map tile corresponding to the viewing angle; and

software instructions for rendering the texture map [tile] tiles at the [region] adjacent regions on the computer display screen to form the texture map on the image surface.

35. (Amended) The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is one of plural predetermined texture map tiles stored in a computer memory.

36. (Amended) The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is calculated based upon the determining of the viewing angle.

37. (Amended) The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is of a predetermined tile structure and includes an oblique parallel projection the predetermined tile structure.

38. (Amended) The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is of a predetermined tile structure and includes a morphing of the predetermined tile structure.

39. (Amended) The medium of claim 34 in which in which the texture map tile corresponding to the viewing angle for each region is of a predetermined tile structure and includes a manually formed [renderings] rendering of the predetermined tile structure.

40. (New) A computer method of applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:

identifying a region of the image surface to which region the texture map is to be applied;

determining a viewing angle for the region;

correlating the viewing angle with a texture map tile corresponding to the viewing angle; and

rendering the texture map tile at the region on the computer display screen.

41. (New) A method of generating a tile data structure in a computer readable medium representing an image texture for a tiled texture mapping, comprising:

determining plural selected viewing angles for viewing the image texture;

correlating each selected viewing angle to a predetermined range of viewing angles that includes the selected viewing angle; and

forming for each of the selected viewing angles a data structure that includes a projection of the image texture relative to the selected viewing angles.

42. (New) In a computer readable medium, computer software instructions for applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:

software instructions for identifying a region of the image surface to which region the texture map is to be applied;

software instructions for determining a viewing angle for the region;

software instructions for correlating the viewing angle with a texture map tile corresponding to the viewing angle; and

software instructions for rendering the texture map tile at the region on the computer display screen.